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| EXAMINER | |
|---|---|
| MERCEDES, DISMERY E | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/993,779 | OZDEMIR, HAKAN | |
| | Examiner | Art Unit | |
| | DISMERY E. MERCEDES | 2627 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *19 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) *6-20 and 43-48* is/are withdrawn from consideration.

5)☒ Claim(s) *36* is/are allowed.

6)☒ Claim(s) *1-5,21-31,33-42,49,50* is/are rejected.

7)☒ Claim(s) *32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *2/11/2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement (IDS) submitted on 3/19/2009 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### *Response to Arguments*

1. Applicant's arguments with respect to claims 1, 21, 37 have been considered but are moot in view of the new ground(s) of rejection.

2. The indicated allowability of claims 27, 33, 38 is withdrawn in view of the newly discovered reference(s) to Rejections based on the newly cited reference(s) follow.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 21-23 and 25-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Christiansen et al. (US 6,369,969).

As to Claim 21, Christiansen et al. further discloses a Viterbi detector operable to recover a synchronization mark from samples of a servo signal generated by an electromagnetic read head that

is coupled to the Viterbi detector with a connection polarity (see figs.2-3b and respective descriptions thereof; and col.3, lines 1-10 and col.5, lines 15-21-- wherein the polarity of the MR head has been preset-the MR head has a bias layer wherein the polarity of this bias layer); and a comparator coupled to the Viterbi detector and operable to determine if the connection polarity is incorrect by comparing the recovered synchronization mark to a reference synchronization mark (fig.3b, col.3, lines 8-10; col.4, lines 20-39 and col.5, lines 39-45--wherein the polarity signal indicates if the polarity of the head is reversed or deviated (incorrect) from the preferred polarity, and this is performed by comparing a sync mark detected with a en estimated sync pattern).

As to Claims 22, Christiansen et al. further discloses wherein the comparator is operable to generate a signal that indicates the determined connection polarity (see figs.2-3a-b wherein a polarity signal is generated col.3, lines 5-10).

As to Claim 23, Christiansen et al. further discloses wherein the circuit is operable to recover the synchronization mark from the servo signal regardless of the connection polarity (fig.3b, 71 the Viterbi detector recovers servo data regardless of the connection polarity, the polarity is detected after the recovery of data).

As to Claim 25, Christiansen et al. further discloses wherein the comparator is operable to determine the connection polarity by: comparing the recovered synchronization mark to the reference synchronization mark on a bit-by-bit basis; determining that the connection polarity equals a first polarity if the number of mismatching bits is less than or equal to a first predetermined threshold; and determining that the connection polarity equals a second polarity if the number of mismatching bits is greater than or equal to a second predetermined threshold (col.3, line 26-col.4, line 10; wherein the connection polarity is determined to be the preferred when the signals 58 or 64

does not exceed threshold, and is deviated from the preferred polarity when it exceeds threshold; see also col.4, line 56-col.5, line 13col.4, line 56-col.5, line 13).

As to Claim 26, Christiansen et al. further discloses wherein the comparator is operable to determine the connection polarity by: comparing the recovered synchronization mark to the reference synchronization mark on a bit-by-bit basis; determining that the connection polarity is positive if the number of mismatching bits is less than or equal to a first predetermined threshold; and determining that the connection polarity is negative if the number of mismatching bits is greater than or equal to a second predetermined threshold (col.3, line 26-col.4, line 10 wherein the connection polarity is determined to be the preferred when the signals 58 or 64 does not exceed threshold, and is deviated from the preferred polarity when it exceeds threshold; see also col.4, line 56-col.5, line 13).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 1-5, 24, 27-31, 33-35, 37-42, 49, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christiansen et al. (US 6,369,969) in view of Leis et al. (US 5,862,005).

As to Claim 1, Christiansen et al. discloses a head-connection-polarity detector, comprising: a circuit operable to recover servo data from a servo signal (col.3, lines 4-26) generated by an

electromagnetic read-write head that is coupled to the circuit with a connection polarity(fig.2, MR head 20,30,34 and col.3, lines 1-10 and col.5, lines 15-21-- wherein the polarity of the MR head has been preset-the MR head has a bias layer wherein the polarity of this bias layer, and thus the MR head, has been determined during manufacture of the disk drive).; and a determinator coupled to the circuit and operable to determine from the recovered servo data weather polarity is reversed (figs.2-3A-B, 24, col.3, lines 5-20 the polarity of the bias layer of the MR head is determined, and wherein this polarity determines if it has deviated from a preferred polarity and col.5, lines 39-45-determines if the polarity signal indicated that the preferred polarity has been reversed).

Christiansen et al. fails to disclose wherein the servo signal having a phase that represents the connection polarity and determine whether the phase of the servo signal is reversed. However, Leis et al. discloses detecting wide bi-phase servo information, and wherein phase of the servo signal is used to determine if the polarity of the head has been reversed (col.11, lines 20-39). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the detector of Christiansen et al. by employing wide bi-phase servo information as disclosed by Leis et al., the motivation being because it is well known and appreciated in the art that wide bi-phase code is polarity sensitive and used for recovering servo information (col.3, lines 30-34 and col.11, 20-22 of Leis et al.).

As to Claim 2, Christiansen et al. further discloses wherein: the circuit is operable to recover a servo-synchronization mark from the servo signal; and the determinator is operable to determine the polarity from the recovered servo-synchronization mark (fig.2, 3B wherein the circuit 71 is operable to recover a synch mark from the read signal from the servo data, and a connection polarity is determined 28 from the synch mark and evaluated to determine if has deviated from a preferred polarity; see also and col.5, lines 25-30).

Christiansen et al. fails to specifically disclose wherein the phase of the servo signal is determined from the recovered synch mark. However, Leis et al. discloses the phase and magnitude of the servo signal is determined from the chunk synchronization (col.11, lines 20-28). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the detector of Christiansen et al. by employing wide bi-phase servo information as disclosed by Leis et al., the motivation being because it is well known and appreciated in the art that wide bi-phase code is polarity sensitive and used for recovering servo information (col.3, lines 30-34 and col.11, 20-22 of Leis et al.).

As to Claim 3, in the combination of Christiansen et al. in view of Leis et al, Leis et al. further discloses wherein the determinator is operable to generate a signal that indicates the phase of the servo signal (col.11, lines 20-28 wherein it is determined chunk sync is 180 out of phase and magnitude is inverted).

As to Claim 4, Christiansen et al. further discloses wherein the circuit comprises a Viterbi detector (fig.3b, 71 wherein it shows a synch mark detector comprising a Viterbi detector: Note this limitation is also met by Leis et al., col.9, lines 25-29 and col.12, lines 38-44).

As to Claim 5, Christiansen et al. further discloses wherein the circuit is operable to recover the servo data from the servo signal regardless of the connection polarity (fig.3b, 71 the Viterbi detector recovers servo data regardless of the connection polarity, the polarity is detected after the recovery of data).

As to Claim 24, Christiansen et al. discloses the detector of claim 21, and further discloses the synchronization mark has pairs and only pairs of consecutive logic 0's and logic l's (col.3, line 11-col.4, line 39). Although, it is inherent that a Viterbi detector comprises a path metric unit, an add-compare-select unit selecting the best surviving path metric, Christiansen et al. fails to specifically

disclose: Viterbi detector comprises, a recovery circuit operable to recover the synchronization mark from the samples of the servo signal by, for each pair of samples, calculating a difference between path metrics for possible states of 00 and 11 of the synchronization mark, and determining a surviving path from the difference, the synchronization mark lying along the surviving path. However, Leis et al. discloses wherein a Viterbi detector is used to recover synch mark (col.11, lines 20-39, fig.12 and respective description thereof). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the detector of Christiansen et al. by using Viterbi algorithm/detection for recovering synch mark, as disclosed Leis et al., the motivation being to provide robust recovery of the servo information while reducing circuit complexity and cost (col.3, lines 15-19).

As to Claim 27, Christiansen et al. discloses a servo channel, comprising: a sampling circuit coupled to receive and operable to generate samples of a servo signal that represents a servo synchronization mark and has a connection polarity set during assembly installation of an electromagnetic read head (.2, MR head 20,30,34 and col.3, lines 1-10 and col.5, lines 15-21--wherein the polarity of the MR head has been preset-the MR head has a bias layer wherein the polarity of this bias layer, and thus the MR head, has been determined during manufacture of the disk drive); and a synchronization mark and polarity detector coupled to the sampling circuit and comprising, a first Viterbi detector operable to recover the synchronization mark from the samples of the servo signal (fig.2, 3b. Viterbi detector receives read signal and recover synch mark-synch mark detect 28); and a comparator coupled to the first Viterbi detector and operable to determine if the polarity is reversed (see fig.3b, comparator 93 and col.3, lines 5-20 the polarity of the bias layer of the MR head is determined, and wherein this polarity determines if it has deviated from a

preferred polarity and col.5, lines 39-45-determines if the polarity signal indicated that the preferred polarity has been reversed).

Christiansen et al. fails to disclose the servo synchronization mark has a phase that represents the connection polarity of an electromagnetic head, and determine the phase of the servo signal is reversed based on the recovered synchronization mark. However, Leis et al. discloses detecting wide bi-phase servo information, and wherein phase of the servo signal is used to determine if the polarity of the head has been reversed (col.11, lines 20-39). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the detector of Christiansen et al. by employing wide bi-phase servo information as disclosed by Leis et al., the motivation being because it is well known and appreciated in the art that wide bi-phase code is polarity sensitive and used for recovering servo information (col.3, lines 30-34 and col.11, 20-22 of Leis et al.).

As to claim 28, in the combination of Christiansen et al. in view Leis et al., Leis et al. further discloses a comparator is coupled to the sampling circuit; and the sampling circuit is operable to generate the samples of the servo signal having a desired phase (see fig.1, elements 46,48,56; fig.9, 14b-15b and col.11, lines 20-39-wherien it is detected if the signal is out of phase).

As to Claim 29, Leis et al. further discloses wherein the comparator is coupled to the sampling circuit; and if the determined phase is opposite to a desired phase, then the sampling circuit is operable to invert the samples of the servo signal (fig.9 and col.11, lines 20-39-circuit is operable to invert the servo signal when the chunk sync is out of phase and the magnitude is inverted).

As to claim 30, Leis et al. further discloses the comparator is operable to generate a phase signal that indicates the determined phase; and the sampling circuit is coupled to the phase

determinator and is operable to generate the samples of the servo signal having a desired phase in response to the phase signal (figs.1,7-8 and col.11, lines 20-39 wherein the signal having the desired in response to an out of phase chunk signal is generated).

As to claim 31, Leis et al. further discloses wherein the phase of the servo signal represents a connection polarity between the sampling circuit and a read head that generates the servo signal (col.11, lines 20-39).

As to claims 33-34 have similar limitations as to those treated in the rejection of Claims 27, 29 and are met by the references as discussed above.

As to claim 35, Leis et al. further discloses the synchronization mark and other servo data include pairs and only pairs of consecutive logic 0's and logic 1's; and the Viterbi detector is operable to recover the synchronization mark and servo data from the samples by, for each pair of samples, calculating a difference between path metrics for two possible states of the binary sequence, and determining a surviving path from the difference, the binary sequence lying along the surviving path (col.12, lines 38-54 wherein Viterbi detector (Viterbi algorithm) is used to recover the synch mark and the servo data).

As to Claim 37, Christiansen et al. further discloses a disk-drive system, comprising: a magnetic data-storage disk having a surface and operable to store a servo synchronization mark and other servo data (fig.2,18); a motor coupled to and operable to rotate the disk (fig.2) ; a read head having a connection polarity set during installation of the read head and operable to generate a servo signal that represents the synchronization mark and the other servo data (fig.2,20 and col.5, lines 15-21 and 39-45-- wherein the polarity of the MR head has been preset-the MR head has a bias layer wherein the polarity of this bias layer, and thus the MR head, has been determined during manufacture of the disk drive); a read-head positioning assembly operable to move the read head

over the surface of the disk (fig.2,vcm); and a servo channel coupled to the read head, the servo channel comprising, a sampling circuit operable to generate samples of the servo signal (fig.4, 72), and a Viterbi detector operable to recover the synchronization mark and other servo data from the samples of the servo signal regardless of the connection polarity of the read head (figs.2-3A-B, wherein the Viterbi detector in conjunction with synch mark detect the synch mark pattern and further detects estimated data sequence (i.e. other data) and col.3, lines 5-20 and col.5, lines 15-21 and 39-45--the polarity of the bias layer of the MR head is determined, and wherein this polarity determines if it has deviated from a preferred polarity, thus a preset polarity has already being set in the head).

Christiansen et al. fails to disclose the servo signal having a phase that represents the connection polarity. However, Leis et al. discloses detecting wide bi-phase servo information, and wherein phase of the servo signal is used to determine if the polarity of the head has been reversed (col.11, lines 20-39). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the detector of Christiansen et al. by employing wide bi-phase servo information as disclosed by Leis et al., the motivation being because it is well known and appreciated in the art that wide bi-phase code is polarity sensitive and used for recovering servo information (col.3, lines 30-34 and col.11, 20-22 of Leis et al.).

As to Claims 38-41 are method claims drawn to the apparatus of Claims 1-3, and are rejected for the same reasons of obviousness as set forth above.

As to Claim 42, Christiansen et al. further discloses wherein the comparator is operable to determine the connection polarity by: comparing the recovered synchronization mark to the reference synchronization mark on a bit-by-bit basis; determining that the connection polarity equals a first polarity if the number of mismatching bits is less than or equal to a first predetermined

threshold; and determining that the connection polarity equals a second polarity if the number of mismatching bits is greater than or equal to a second predetermined threshold (col.3, line 26-col.4, line 10; wherein the connection polarity is determined to be the preferred when the signals 58 or 64 does not exceed threshold, and is deviated from the preferred polarity when it exceeds threshold; see also col.4, line 56-col.5, line 13col.4, line 56-col.5, line 13).

Christiansen et al. fails to disclose determining if the servo signal is in phase. However, Leis et al. discloses detecting wide bi-phase servo information, and wherein phase of the servo signal is used to determine if the polarity of the head has been reversed (col.11, lines 20-39). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the detector of Christiansen et al. by employing wide bi-phase servo information as disclosed by Leis et al., the motivation being because it is well known and appreciated in the art that wide bi-phase code is polarity sensitive and used for recovering servo information (col.3, lines 30-34 and col.11, 20-22 of Leis et al.).

As to Claim 49 is a method claim drawn to the detector of claims 1,5,37 and are rejected for same reasons of anticipation as set forth in the rejection of claims 1,5,37 above.

As to Claim 50, has similar limitations as to those treated in the rejection of claims 1 and 29, above, and are met by the reference as discussed above.

***Allowable Subject Matter***

7. Claim 32 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claim 36 is allowed. Claim 36 is allowed for the same reasons as noted in the office action mailed on 12/22/2008.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Bowen et al. (US 6,534,974); Kosugi (US 5,757,576); Takahashi (US 6,507,447); Hayashi (US 5,430,582).

10. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 3/19/2009 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DISMERY E. MERCEDES whose telephone number is (571)272-7558. The examiner can normally be reached on Monday - Friday, from 9:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Thi Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dismery E. Mercedes/
Examiner, Art Unit 2627

/Tianjie Chen/
Primary Examiner, Art Unit 2627